

Construction Math Syllabus

Time: 40 hours

Recommended Class Size: 12

Prerequisites: None

Course Description: This course is designed to introduce the participant to the basic math skills needed to be successful in the construction industry. Math and calculations are the foundation of the construction industry. Basic mathematical calculations and measurement systems are often used on the construction site. Therefore, it is very important for both apprentices and journeymen to master these tools. To advance in the construction industry you must be able to convert decimals, calculate quality take-offs, shoot elevations, operate a level laser, use percentages, slope ratios, read blueprints, and understand squaring principals. This course covers some of the mathematical procedures that must be mastered and gives examples of how they might apply to work in the construction industry.

Goals/Objectives/Student Learning Outcomes:

- Read a ruler and measuring tape for feet, inches and fractions.
- Measure objects such as tables, doors, windows, wall and floor to within $\frac{1}{8}$ of an inch.
- Simplify fractions to their lowest terms
- Add, subtract, multiply and divide fractions.
- Convert architectural measurement (feet, inches and fractions) to decimal feet.
- Convert decimal feet to architectural measurement (feet, inches and fractions).
- Define the term *Above Sea Level* (ASL).
- Calculate elevation difference between Stake 1 and Stake 2 hubs.
- Set-up a laser level and transit.
- Shoot elevations.
- Define the term *Benchmark* (BM).
- Define the term *Height of Instrument* (HI).
- Define the term *monument*.
- Calculate the rate per foot and slope percentage using length and rise measurements.
- Calculate the rise or fall using length and rate information.
- Calculate the length using rise and rate information.
- Identify information found on reference stake.
- Layout reference stakes, "feathers," hubs and stations.
- Demonstrate how to shoot elevations on hubs.
- Calculate elevation between stations for calculating rate per foot and percentage total.
- Layout batter boards for a concrete slab on-grade (LCM option)
- Fill in information on reference stakes: offset, CL, Fill or Cut FL.

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- Identify and define the following formulas:
 - Area
 - Volume
 - Concrete cubic yards
 - Diagonal for square
 - Diagonal for rectangle
- Calculate the area of a slab on-grade sidewalk, wall and column in square feet.
- Calculate the volume of a slab on-grade sidewalk, wall and column in cubic feet.
- Calculate concrete cubic yards for slab on-grade sidewalk, wall and column.
- Identify and define the following formulas for
 - Asphalt tonnage
 - Estimating masonry materials: block and brick
 - Linear feet of form per cubic yard of concrete
 - Volume of trench
 - Volume of pipe
- Calculate asphalt tonnage for a section of road and Trench Cut.
- Estimate how much common block (8" wide x 8" high x 16" long) is needed for a block wall.
- Calculate rebar tonnage of various diameters.
- Calculate the volume of a trench, pipe and cubic yards of slurry for backfill

Standards

This 40-hour course complies with all OSHA and Cal/OSHA safety standards.

Classroom Rules and Procedures

- All classes begin at 6:30 am and end at 3:00 pm
- Upon entering classroom, all participants must sign in and be seated by 6:30 am
- Class will consist of a combination of lecture, video, demonstration, coached group exercises, individual exercises and assessment.
- Students are required to report to class ready to work and maintain the provided PPE

Textbooks/Readings/Materials

- *LTS Construction Math Student Handout Packet & IV*
- *LTS Construction Math Exit Exams*

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Tools/Equipment/Other Materials:

- 1-Laser level
- 1 tripod
- 1-grade rod 10th and 100th
- 10-calculators
- 10-Builder's level
- 10-Engineers' ruler
- 10-Reference Stakes

Course Requirements

To receive credit for the course, participants must:

- Be present for full forty hours
- Participate in all classroom exercises
- Pass daily written exams
- Pass hands-on exams

Course Policies

- Participants must be on-time and ready to work.
- Participants must return from breaks on-time.
- Participants must participate in each exercise and assignment

Assessment and Grading

Participants will be assessed on the following:

- All written exams must be passed with a score of 80% or above.
- All hands-on exercises are graded on performance and participation. They are pass/fail and must be passed with a score of 80% or above.

Safety

Failure to maintain and use PPE may result in dismissal from the course.